

RAILTAINER SERVICE BACKLOG: A CASE STUDY OF RIFT VALLEY RAILWAYS ICD SERVICE

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**A management research project submitted in partial fulfillment of the
requirement for the award of the degree of Master of Business Administration
(MBA), School of Business, University of Nairobi.**

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Declaration

This research project is my original work and has not been presented for a degree in any other University.

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This Management Project has been submitted for examination with my approval as University Supervisor.

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Dedication

This project is dedicated first to my loving wife, Josephine Akoth, whose assistance and moral support enabled me to complete the course. Secondly it is dedicated to my late father Michael Patrick Ayimha, mother Mary Ayimha and my family members for their moral support during this period.

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May almighty God bless them.

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List Of Abbreviation

CDO	Central Documentation Office
C & F	Clearing & Forwarding Firm
EDI	Electronic Data Interchange
EKT	Embakasi Container Terminal
FIFO	First In First Out
FWBC	Flat Wagon Bogie Container
ICD	Inland Container Depot
IFC	International Finance Corporation
ISO	International Standards Organization
KAA	Kenya Airports Authority
KBT	Kibos Container Terminal
KCAA	Kenya Civil Aviation Authority
KFS	Kenya Ferry Services
KLA	Kampala
KPC	Kenya Pipeline Company
KPA	Kenya Ports Authority
KRA	Kenya Revenue Authority
KRC	Kenya Railways Corporation
LSLB	Low Sided Long Bogie
LSLC	Low Sided Long Container
MPRO	Mombasa Port Release Order
NRB	Nairobi
OSCAR	Operations Costing For African Railways
RMG	Rail Mounted Gantry
RORO	Roll On Roll Off
RVR (K)	Rift Valley Railways Kenya
RVR (U)	Rift Valley Railways Uganda
SIMBA 2005	Customs Clearance System
TEU	Twenty Foot Equivalent Units
TLB	Transport Licensing Board
URA	Uganda Revenue Authority
URC	Uganda Railways Corporation

Abstract

This study's objective was to look into the causes of the railtainer backlog at the port of Mombasa. This is because the backlog is affecting the quality of the service and off take rate of rail bound containers from the Port. The backlog problem was there during the time of Kenya Railways and has continued to persist during Rift Valley Railways. A number of writers have attempted to get to the root causes of container backlog. According to Mongelluzo (2005) the handling of larger ships results in greater uneven flow of containers as more containers arrive during port calls. This uneven flow strains the port and railroad operations. Jackson (2005) says that the international marine container volumes have surged over the last several decades, but the ports and their supporting container distribution networks have struggled to increase capacity to match this expansion. Kulich (2004) asserts that the capacity problem is exacerbated by the fact that railroad and truck carriers serving the ports also experience severe capacity shortages.

A case study research design was used and the population of study comprised of 75 staff (i.e. forty five from Rift Valley Railways and thirty from Kenya Ports Authority). Stratified random sampling was used to select a sample of forty percent of the population. The study used a semi structured and undisguised questionnaire that had both open and closed ended questions to gather primary data. The questionnaire was administered on a "drop and pick later" basis and a follow-up made to ensure a high rate of response.

A total of thirty questionnaires were administered but only twenty eight questionnaires were filled and returned, this translates to ninety three percent response. There was a fifty eight percent awareness that there existed a targeted dwell time for containers at the port after discharge from ships while eighty nine percent of the respondents were aware that there were delays in loading of containers. The study confirmed that there was a

backlog of rail bound containers at the port. The backlog had various causes most of which were within RVR's control. The solution to minimize the backlog lies in RVR managing the variables within its control.

CHAPTER ONE: INTRODUCTION

1.1 Background

1.1.1 Raitainer Service

According to Bernstein (2004) the railroads are generally more cost effective than trucks for handling inland container moves of significant distance. Raitainer service thus provides a more efficient and cost effective transport solution for containers. The term raitainer refers to a rail service dedicated to the transportation of containers from the port of Mombasa to the Inland Container Depots (ICD) i.e. Embakasi(EKT), Kibos(KBT) and Kampala(KLA) and vice versa. These containers are mostly inland bound imports while the port receives exports and empty containers from the Inland Container Depots. The empty containers are for relocation. (Kenya Railways policy tile ref: CTM/T50/238A)

In 1983, the idea of establishing an Inland Container Depot was mooted and it is from this noble idea that Embakasi Inland Container Depot became the first to be established in 1984. An Inland Container Depot is a dry port which is linked to the port by rail. The Inland Container Depots handle only rail bound containers to and from the Port of Mombasa, Embakasi, Kibos and Kampala. The first Raitainer service was launched with the establishment of Embakasi Inland Container Depot. The containers are transported by rail from the port. This portion of the journey is perceived to be a continuation of the ships journey. Customers clear their consignments in Nairobi after the arrival of the containers. The Rift Valley Railways runs two raitainer services daily from the Port of Mombasa to Embakasi and vice versa. Other Inland Container Depots were later established at Kibos and Eldoret by the Kenya Ports Authority, the aim being market expansion. (Retrieved on June 27th, 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

1.1.2 Raitainer Backlog

The term raitainer backlog (also known as rail bound container congestion) refers to the situation where rail-bound containers remain unnecessarily long at the port after discharge from ships to await transportation by rail. This implies that the ships discharge rate is greater than the rail off-take rate. According Mongelluzo (2005) the handling of larger ships results in greater uneven flow of containers as more containers arrive during ship port calls. This uneven flow strains the port and railroad operations as some ships discharge bigger volumes than can be handled by railroad.

Jackson (2005) says that the international marine container volumes have surged over the last several decades, but the ports and their supporting container distribution networks have struggled to increase capacity to match this expansion. Most of the container ports and their supporting distribution networks have not expanded their capacity to match the volume of growth. According to Kulich (2004) the capacity problem is exacerbated by the fact that railroad and truck carriers serving the ports are also facing severe capacity shortages. The backlog problem continues to recur, it was there during the time of Kenya Railways and has continued to persist during Rift Valley Railways. The backlog problem is caused by seasons, policy, management, operation and equipments. Appendix V on page sixty three has a table on the backlog of rail bound containers at the port of Mombasa.

1.1.3 History Of Railways In Kenya

According to Hill (1987). Britain took over East Africa during the scramble for Africa in 1885 with the aim of opening up the region for European settlement, trade, suppression of slave trade and construction of a railway line. On 30th May, 1896 the construction commenced at Kilindini, under the supervision of Sir George Whitehouse. They encountered many

problems during the construction and eventually reached Port Florence (now called Kisumu) in 1901.

The Kenya - Uganda Railways was renamed Kenya - Uganda Railways and Harbours on December 20th. 1927. On May 1st. 1948. the Kenya-Uganda Railway and Harbours was amalgamated with those of Tanganyika forming East African Railways and Harbours. The three East African countries later formed the East African Community on June 1st, 1969 to oversee the common services in the region and this gave birth to the East African Railways Corporation. In August 1976, the East African Community broke up due to both political and financial problems. This resulted in the formation of Kenya Railways Corporation on January 1st, 1977 and same legalized by an Act of Parliament Cap.397 of the laws of Kenya on January 20th. 1978. The Corporation operated 2740 Kilometers of permanent way comprising of the mainline from Mombasa to Malaba and the branch lines i.e. Voi - Taveta. Konza - Magadi. Nairobi - Nanyuki. Gilgil - Nyahururu, Leseru - Kitale and Nakuru - Butere.

The liberalization of the Kenyan economy in 1992 exposed the Corporation to stiff competition from road hauliers as opposed to the protectionist policies earlier accorded to it by the government. Agarwal (2007) states that, "immediately after 1983, the rail business began a steady decade-long slide into insolvency as maintenance and investment lagged, revenues dropped, but workforce continued to expand". This left the Kenyan government with the idea of concessioning as the only solution to revamping the Corporation. Kenya also has a private rail known as Magadi Soda Rail Company which was established in 1994 and commenced operation in 1995. Magadi rail only transports soda ash for export and imports (e.g. fuel/spare parts) for Magadi Soda Company. (Retrieved on July 24th, 2008 from Magadi Soda Company website <http://www.magadisoda.co.ke>). In 1998. Hon. Mudavadi, the then Kenya's

Minister for Finance announced the government's intention to concession Kenya Railway.

The government appointed the International Finance Corporation (IFC) as the Lead Transaction Advisor for the privatisation program. IFC commenced work in September 2002 and completed the first phase covering the "Due Diligence Study" in June 2003. This was followed by several discussions between the Governments of Kenya and Uganda, where it was decided to jointly concession the two networks. The joint concessioning was circumvented by the dependency of the two networks on each other. Adverts for bids were placed in both local and international print/electronic media. The bids were eventually opened on July 2005 and Tudor Holdings announced the winner. Tudor Holdings later changed its name to Rift Valley Railways (RVR) on November 7th, 2005. (Certificate of change of name, No. C120151 dated 17/11/2005)

.4 Rift Valley Railways

On November 1st, 2006, the Kenya and Uganda Railway Corporations were officially handed over to the Concessionaire at the Nairobi Railway Station, Kenya; Nairobi was to be the system headquarters'. RVR took over control of the rail operations in both countries after a commitment to pay the concessioning fee, which was done on December 15th, 2006 and the concession agreement eventually signed on January 23, 2007. It concessioned freight service for 25 years and passenger service for 5 years. The Company was incorporated in Kenya as Rift Valley Railways (K) while in Uganda as RVR (U). Rift Valley Railways (K) is a company formed by a group of companies led by South Africa's Sheltam with 35% shareholding as the lead investor. Australian Babcock & Brown 10%, Trans-century 20%, ICDC Investment 10%. Primefuels 15% and Mirambo Holdings 10%. (RVR memo ref: RVR/MD/MEMO/0710/08 dated July 10th, 2008)

Rift Valley Railways (K) offers rail and marine transport services in both Kenya and Uganda. It operates 2350 Kilometers of permanent way, seventy two stations, eight depot stations, fifty one locomotives, one ship and six thousand and thirty eight wagons. Only sixty three percent of the six hundred and eighty four container carrier wagons are operational. The container carriers are the wagons used for the railtainer service. The Rift Valley Railways (K) transport services are defined by the nature of the product handled and are as appended:-

- i. Goods i.e. conventional, liquids, containers.
- ii. Passenger: - passenger services are offered to Mombasa. Nanyuki. Kisumu and Butere.
- iii. Commuter services: - available in Nairobi only.

Segmentation in Rift Valley Railways (K) is done on a geographic, customer and product/service basis for ease of managing the market. A wagon only serves one or two segments.

Statement of the Problem

The backlog problem was there during the time of Kenya Railways and has continued to recur over the years. Rift Valley Railways has continued to experience backlog of rail-bound containers at the Port from the time it took over from Kenya Railway Corporations on November 1st, 2006 to date. Railtainer backlog (also referred to as congestion of rail bound containers) refers to the situation where rail-bound containers remain unnecessarily long at the port after discharge from ships to await transportation by rail. This implies that the ships discharge rate is greater than the rail off-take rate. The loading of the containers on to the wagons was to be straight from the ships hook on a first in first out basis and targeted a dwell time of less than two hours from discharge. This was meant to keep the wagons rolling and containers dwell time at bare minimum.

The shipping lines give the customers a free period to relocate the container after offloading, failure to adhere to this result in a demurrage charge being levied. The customers hence incur demurrage cost arising from their inability to relocate the container within the stipulated time. The backlog also implies late arrival of the inputs to the factories. This affects the logistics supply chain and at times it results in stockouts, shutdowns and damage to products due to expiry. The backlog results in loss of business as some containers earlier nominated for transportation by rail are diverted to road. The Shipping lines do at times advise their principals to either reduce or stop nominating containers for railage till the backlog reduces; this is a de-marketing effort whose result is a decrease in market share.

However, related studies have been undertaken on port congestion and not railtainer backlog (congestion) for example a closely related study entitled "Improvement of Transit Systems in Southern & Eastern Africa" was undertaken on behalf of UNCTAD by Infra Africa (Pty) Ltd on April 7th, 2003. (Ref: UNCTAD/LDC/2003/3 report of April 7th, 2003). The study found out that the transit systems serving the ports had a capacity and operational problem. The solution recommended required co-operation among the different governments, stakeholders and non-government organization for the gap to be narrowed as the transit systems served more than one country. Road and rail are the only two modes for transportation of containers from the port of Mombasa to the hinterland. The market share for railtainer service has been declining over the years to the current market share of 11% against the perception of rail market share being greater than road's. This has resulted in more containers being nominated for transportation by road. The effect of this increase in road market share has been massive damage to our road network and straining of the road resources as they are unable to cope with the overfull demand because of capacity and other operational problems. A knowledge gap on railtainer backlog exists and this justifies the study as it will bridge the knowledge

gap. The study will enable RVR (K) know the causes of the railtainer backlog and this will enable both RVR (K) and KPA address the causes in order to minimize the backlog and improve on service quality.

1.3 Study Objective:-

To identify the major causes of the railtainer backlog at the port.

1.4 Importance of the Study:-

The study will result in the identification of the lapses or delays to loading and clearance of wagons at the Port. These, when eliminated will have the overall effect of improving the turn around of wagons which will translate to more revenue for Rift Valley Railways (K) and faster off-take of containers from the port for the stakeholders and Kenya Ports authority.

The study will result in the reduction of stocks held by the customers as they will be able to synchronize their production and input logistics because of the predictability of the railtainer service. Hence reducing overstocking which is used by firms as a stop gap-strategy to avoid stock outs due to the delays at the port caused by the backlog.

The study will be beneficial to the customers as it will result in the minimization of expenses due to demurrage costs. These are costs incurred due to inefficiencies of the Rift Valley Railways and the Kenya Ports Authority. The demurrage charges are paid by the customers to the shipping lines for holding the containers beyond the stipulated free period as a result of the backlog at the port.

Rift Valley Railways (K) will also use the results of the study as a basis for increasing its market share and investment in new wagons. This will enable both the Rift Valley Railways (K) and Kenya Ports Authority cope with the growth in container imports and provide an efficient, reliable and predictable service to its customers.

CHAPTER TWO: LITERATURE REVIEW

2.1 Modes of Transport

Transport is the movement of people and goods from one place to another. The term is derived from the Latin word *trans* meaning "across" and *portare* meaning "to carry". The Kenyan transport system comprises of five major modes i.e. road, air pipeline, maritime and railways. These modes of transport integrate various production, market and population centers and facilitate mobility in both rural and urban areas. Their management is done by different organizations i.e. Kenya Ports Authority, Kenya Ferry Services, Kenya Airports Authority, Kenya Civil Aviation Authority, Kenya Railways Corporation, Magadi Soda Company, Rift Valley Railways. Kenya Pipeline Company. Transport Licensing Board and Road Transport Department of Kenya Revenue Authority. (Retrieved on July 23rd. 2008 from Ministry Of Transport website <http://www.ministryoftransport.go.ke>)

2.1.1 Roads

The roads are under the docket of the Ministry of Roads and Public Works which is responsible for their design and maintenance. Kenya's public road network measures 178,000 kilometers. This network comprises 63,500km of classified roads. 14,500km of urban roads and an estimated 100,000km of unclassified rural roads. Kenya has tarmac, concrete, loose surface and carbroaded roads which provide access to the different parts of the country. The loose surface roads are impassable during the rainy season. Road transport is very important as it carries about 93% of all cargo and passenger traffic in the country (Daily Nation, dated September 12th, 2008, Pg 34-35). The Northern corridor highway starts from Mombasa and runs through Busia and Malaba. This road serves the Great Lake countries. It has a high frequency of use and is currently under re-carpeting. (Retrieved on July 23rd. 2008 from Ministry Of Roads website <http://www.ministryofroads.go.ke>)

2.1.2 Air

Air transport is the main mode of transport for tourists, business people, perishable goods, high value exports and imports. Kenya has three major international airports, numerous small airports (e.g. Kisumu airport, Wilson airport) and more than two hundred and fifty air strips strategically located across the country. The three major International Airports are Jomo Kenyatta International Airport (JKIA) located in Nairobi, Moi International Airport in Mombasa and Eldoret International Airport in Eldoret. On August 24, 2007, an approval was accorded for Kisumu Airport to be upgraded to International status. JKIA is the hub for all International airlines and is currently undergoing expansion to increase its capacity from twenty three to forty six big flights. The expansion project is envisaged to be complete by 2009. (Retrieved on July 23rd, 2008 from Kenya Airports Authority website <http://www.kaa.co.ke>)

2.1.3 Pipeline

The pipeline is the chief transporter of white oil products (i.e. petrol, kerosene and diesel) to the hinterland for both domestic and foreign consumption. It is managed by Kenya Pipeline Company which falls under the Ministry of Energy. The pipeline stretches from Mombasa to Nairobi, Eldoret and Kisumu. The Mombasa - Nairobi pipeline is 450 Kilometers long with four pump stations at Changanwe, Maungu, Mtito Andei and Sultan Hamud. It was the first one to be constructed. In December 2006, the pipeline expansion contracts to Uganda were awarded to successful bidders who have since commenced work. (Retrieved on July 25th, 2008 from Kenya Pipeline Company website <http://www.kpc.co.ke>)

2.1.4 Maritime

Maritime transport is also referred to as the waterways. It consists of one major seaport, and other smaller ports along the Kenyan coastline, lakes and rivers. Mombasa port is the principal sea port. The port handles all types of ships and cargo services not only for Kenya but also the other hinterland countries of Rwanda, Burundi, and Democratic Republic of Congo among others. The piers

along Lake Victoria play a vital role of linking Kenya to Uganda and Tanzania enabling the transportation of both passengers and goods across the lake. There are plans to develop Lamu as the second sea port in the government's vision 2030. (Retrieved on July 27th, 2008 from Kenya Maritime Authority website <http://www.maritime.co.ke>)

2.2 Kenya Ports Authority (KPA)

The history of the port of Mombasa can be traced back to the 18th Century when dhows called at the Old Port on the north side of Mombasa Island. East Africa was colonized by Great Britain and Germany in the 18th and 19th centuries, this eventually culminated in the partitioning of East Africa in the 1890s. In 1895, railway construction work began from Mombasa to Kampala, the aim being to open up the hinterland for trade in coffee, tea, ivory and skins. This led to the expansion of trade and demand for a new jetty to handle the larger ships which were bringing railway construction materials. A new port was established in 1896 at Kilindini Harbour with the building of a jetty on the west side of the island which was to be used mainly for the transfer of goods between sea-going vessels and the Kenya to Uganda railway. Later, three more jetties were built to handle rail bound goods, other imports and exports freight. (Retrieved on July 29th, 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

The development of the modern Port of Mombasa began in 1926 with the completion of two deep water berths supported by transit sheds at Kilindini harbour. The period from 1926 to 1967 marked the expansion of the port to accommodate the increase in trade. A total of 14 berths were constructed during the 1926 to 1967 period to expand the capacity of the port. Goss (1974) says that unless a cargo ship can be unloaded quickly in a port, its advantage is lost. With the imbalance in supply and demand, congestion becomes a common scenario in most ports. The Kenya Ports Authority's drive to make the port efficient led to the year's 2000 to 2005 marking equipment modernization and

renewal period. Appendix IV on page sixty two has a picture of the container terminal with the new equipments. This resulted in over 438,000teus and thirteen million tons of cargo being handled by the Port in 2005. (Retrieved on July 29\ 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

Railways in Kenya

Rail transport is the transportation of passengers and goods by means of wheeled vehicles (i.e. coaches and wagons) specially designed to run along railroads. Rail transport is part of the supply chain logistics, which facilitates the international trade and economic growth in most countries. Amin. Willets and Matheson (1986) state that the British took over East Africa during the scramble for Africa in 1885 with the aim of opening up the region for European settlement, trade, suppression of slave trade and building of a railway line. On 30th May, 1896 the construction commenced at Kilindini, under the supervision of Sir George Whitehouse. The construction led to the establishment of most Kenyan towns e.g. Mombasa, Voi, Taveta, Makindu, Emali, Sultan Hamud, Athi River, Kajiado, Magadi. Nairobi, Nakuru, Nanyuki. Nyahururu, Eldoret, Bungoma, Kisumu and Malaba.

Agarwal (2007) says that "the railway played a key role in the early development of East Africa by serving for decades as the most important means of moving people and goods back and forth between the hinterland and the sea port of Mombasa". Railway provides the cheapest mode of transport for bulky goods. The rail network runs from Mombasa to Taveta, Magadi. Nanyuki. Nyahururu. kisumu and Malaba. Most of the Kenyan towns are located along the railway line and owe their origin to the construction of same. The railway makes a major contribution to the development of the economies of the regions. Owing to the important role played by the railway, a division was established at the Ministry of Transport. This division is responsible for the development of policies for the rail sub-sector. (Retrieved on August 29th).

2008 from Ministry Of Transport website <http://www.ministryoftransport.go.ke>)

Concessioning of Kenya Railways

The liberalization of the economy in 1992 greatly affected Kenya Railway Corporation's performance as it exposed railways to stiff competition from road hauliers. This marked the end of its monopoly era in transportation and ushered in an era of continued decline in its market share and performance. Agarwal (2007) says that "immediately after 1983, the rail business began a steady decade-long slide into insolvency as maintenance and investment lagged, revenues dropped, but workforce continued to expand". This left the Kenyan government with the idea of concessioning as the only solution to revamping the Kenya railways.

In 2003, the Kenyan and Ugandan governments took a strategic decision to jointly concession Kenya and Uganda Railways as one unit. On July 8, 2004 a Memorandum of Understanding and a general blueprint for the design of the joint concession was signed. It was to be awarded through a competitive bidding process governed by the laws of Kenya and Uganda in 2005. On October 14th, 2005 Sheltam of South Africa was announced the winner of the bid. The handing over was done on November 1st, 2006 at Nairobi Railway Station in Kenya. The concession agreement was for 25 years where the railway assets such as the infrastructure, locomotives, rolling stock, plant and maintenance equipment, some selected property assets were conceded to the concessionaire. According to the agreement RVR (K) was to make a minimum investment of US\$ 5 million in the railway network for the first 5 years. In addition a total of US \$390 million was to be invested in the upgrading of track infrastructure and rolling stock over the life of the concession. RVR (K) was to pay Kenya Railways Corporation an annual concession fee of 11.1% of freight revenues and US \$ 1 million per annum for the passenger service. The Kenya Railways Corporation was to be responsible for monitoring the Concession

agreement and ensuring that Rift Valley Railways (K) complies with the operating standards and safety regulations as specified in the Concession Agreement. (Kenya Concession Agreement. January 23rd. 2006. Page 27)

The concession was envisaged to result in a more modern railway sector, reduced tariffs and increased market shares for the rail freight traffic. The increased efficiency was perceived to result in reduced cost of transportation and road maintenance due to decrease in road damage as a result of cargo shifting back to rail. (Retrieved on August 29th, 2008 from Ministry Of Transport website <http://www.ministryoftransport.go.ke>)

Railtainer Service

The term refers to a rail service dedicated to clearance of containers from the port to the Inland Container Depots and vice versa. These containers are mostly imports while the port receives exports and empty containers from the Inland Container Depots. The empty containers are mostly for relocation. Railtainer service is geared towards providing a more efficient and cost effective transport solution to both importers and exporters. (Kenya railways policy file ref: CTM/T50/238A)

Evers & Johnson (2000) recommend the addressing of issues like communication, transit time and delivery reliability in order to make railroad more efficient. According to Bernstein (2004) the railroads are generally more cost effective than truck for handling inland container moves of significant distance, though transit times and other service factors may be compromised. Initially there were only two designated services at commencement i.e. A21 scheduled to depart from the Port at 14:00hrs while the return service from Inland Container Depot Embakasi i.e. A22 scheduled to depart at 16:00hrs. All the two services were to run on a daily basis. The service from the port was for transporting imports to the hinterland while the one from Inland Container Depot Embakasi was for transportation of exports and empty containers to the

port for relocation. Chen and Huirong (2003) asserted that a better-developed railroad capacity would bring an increased flow in the goods transported by rail. Obviously, the rail bound traffic has significant capacity limitation and as such it is not wise to just increase the capacity only by improving the infrastructure facility because it is not cost effective. On the contrary, some other management issues can better improve the rail bound capacity. Turner. Windle and Dresner (2004) recommend the improvement of railtainer velocity through coordinated and joint planning with the ports. They emphasized the importance of rail-port connections for both port and railroad efficiency.

A Railtainer has a capacity of conveying a maximum of 50teus (i.e. fifty twenty foot containers on one train) i.e. for Embakasi bound containers while 36teus respectively for Kibos and Kampala bound containers. Railtainer clearance capacity is a function of the gross weight of the container. The Railtainer train has a trailing load capacity of 1.000tonnes gross and a transit time of eighteen hours to Inland Container Depot at Embakasi. Appendix VI on page sixty four has a picture a railtainer train with upcountry bound containers. At present. Rift Valley Railways (K) runs an average of two trains daily with a transit time of twenty eight hours but the focus is on three trains daily from the Port in future. (Kenya Railways Working Timetable, December 1st, 1990, page 80)

The service to Kampala was erratic and raised a lot of concern. This lead to the then KPA managing director Mr. Ondego establishing a task force on April 26th, 2004 to look into the establishment of a "seamless" train service between the port of Mombasa and Kampala. The taskforce had three mandates i.e. establishing a reliable and efficient rail service, evaluating and documenting the problems afflicting the rail services between the cities and reviewing train services and how they interface between Kenya Railways and Uganda Railways Corporation. (Retrieved on

September 24th, 2008 from East African newspaper website [http:// www.theeastafrican.co.ke](http://www.theeastafrican.co.ke)) The stakeholders' desire for an efficient, reliable and predictable service led to the introduction of a new

service to Kampala in 2005 branded "seamless service". The containers were to be consigned to Inland Container Depot Kampala which was then under the management of the Uganda Railways Corporation and now Rift Valley Railways (U). The service is scheduled to run three times in a week on Mondays, Wednesdays and Fridays. It aimed at reducing the dwell time of transit containers at the port by consolidating and moving them in one block. A seamless train conveys 36teus and takes live days to Kampala. The customers clear their goods on arrival at Kampala while the clearance at Mombasa is done by the Clearing & Forwarding Agents. (KRC, KPA, URC, LIRA & KRA Seamless railtainer service MOU dated October 18th, 2004)

Railtainer service is available at the Mombasa Port, Inland container depots Embakasi, Kibos and Kampala. The rail-bound import containers have dedicated loading points at the Port. These places are RMG (rail mounted gantry area), RORO (roll on roll off) yard and yard 7- 8. Appendix HI on page sixty one has a picture of the RMG loading point that shows wagons being loaded. All rail bound import containers are transferred to these points to await loading on a first in first out basis (FIFO). The RMG has four loading lines and is the biggest of all the three areas.

According to Moeva (1990) a container wagon has the capacity of conveying a forty foot, two light twenty foot or a single heavy twenty foot container. The container wagons have various net weight capacities ranging from thirty six tonnes to maximum of forty four tonnes. The wagons have an axle load of a maximum of fifteen tonnes per axle when compared to seven tonnes per axle for road transport. This gives rail an advantage over road when it comes to clearance of heavy containers. (Kenya railways working timetable, December 1st, 1990, page 58)

Railtainer pricing is done on the basis of distance, weight and size of container e.g. the current rate for ICD Embakasi is US \$ 468 for a twenty foot and US \$ 900 for a forty foot. ICD Kibos is US \$ 780 for a twenty foot and US \$ 900

ICD Kampala is US \$ 780 for a twenty foot. Thus the pricing for a twenty footer varies with the weight (light below twenty three tonnes while heavy is above twenty three tonnes). The pricing for all transit and inland container depots bound containers is in dollars while it is in local currency for the destinations outside the inland container depots but within Kenya. Value added tax is not levied on inland container depots bound containers as this journey is deemed to be a continuation of the ships journey. The variation in pricing is because of the opportunity cost e.g. a heavy twenty footer is priced highly because of the lost opportunity of conveying another twenty foot. Costing is done using OSCAR costing model which factors the fixed costs, variable costs and a mark up. The freight charges are prepaid for Kampala and other destinations, while RVR (K) bills KPA for ICD Embakasi/Kibos Raitainer service on arrival of the containers at the destination. (Rift Valley Railways Tariff Notice, November 5th, 2007)

On shipment of a container from overseas, the shipping line forwards the bill of lading to their local office/agent at the destination (Mombasa). This is either done through telegraphic or electronic data interchange (EDI). The document forwarded is known as a bill of lading. Specification on whether the container is to be taken delivery of at the point of discharge (i.e. the port) or at Inland container depot is done before shipping from point of origin. Inland container depot bound containers (with the exception of Kampala) are issued with through bills of lading (TBL). The shipping line office at destination (Mombasa) forwards same to Kenya Ports Authority either in a soft or hard format. The soft format is forwarded electronically through EDI. This is done before the ships arrival in order to enable preparation and subsequent transfer of the container. The bill of lading together with the Mombasa Port Release Order (MPRO), request for railage and railways consignment note are forwarded to the Central Documentation Office (CDO). CDO forwards same documents to RMG/RORO/yard 7 8 when through with processing in order to enable the transfer of the containers and subsequent loading on to wagons.

The containers are supposed to be loaded from the hook (i.e. ship's discharging crane) on to the wagon on a first in first out (FIFO) basis. The loading was targeted at a dwell time of less than two hours but this has proved elusive to attain due to logistical problems and congestion of rail bound containers at the port. The loading from hook to wagon was meant to keep the wagons rolling and containers dwell time at bare minimum, thus keeping any congestion at the container terminal at bare minimum. One requires a bill of lading, a combined railway consignment note and a C63 (i.e. a customs document) for Kampala ICD bound containers. These containers are only loaded on to wagons when customs are through with processing of C63 which is done electronically using the SIMBA 2005.

The acceptance of consignment is done by Rift Valley Railway (K) staff after the documentation is through and the container has been loaded on to a wagon. Acceptance involves the application of the correct rate, calculation of the cost of transportation, preparation of value cover, manifest and rail tracker documents. All these documents are prepared manually. The Freight agent staff forward the goods invoices to rail tracker staff after finishing with them. The rail tracker staff in turn keys the information into the advanced cargo information system. Goldratt and Cox (2004) stipulated that port capacity is affected by a number of issues e.g. the operational, documentation and security compliance efficiency of railroads, trucks, ocean carriers, shippers and Ocean Transport Intermediaries. Delays at any or all of these points in the chain reduce container throughput velocities and subsequently tie up capacity longer than necessary and may cause significant capacity reductions with little or no prior warning. Clearance of Inland Container Depot (EKT and KBT) bound container is undertaken on arrival at the Inland Container Depots. The clearance is done with Kenya Revenue Authority, Kenya Ports Authority. Port Police, and Kenya Bureau of Standards etc.

Promotion of Inland Container Depot (F:KT and KBT) bound container is a tricky issue as it involves more than one player. It mainly involves Rift Valley

Railways (K), shipping lines and Kenya Ports Authority. I lie three players usually undertake to promote the service jointly because of vested interests. The promotion of the service is done by shippers through their principals in Europe, USA, and Asia while Rift Valley Railways (K) and Kenya Ports Authority *undertake it through participation* in various local shows, international exhibitions/conferences, and websites. Rift Valley Railways (K), Kenya Ports Authority and the shipping lines use their website for promotion of the service electronically. Pricing is rarely mentioned during promotion as the shipping lines load the Rift Valley Railways (K) rates with their own costs and margins. Promotion of the service is done weekly through the Standard newspaper's "Transport Magazine" and brochures during shows (both local and international), at the weekly and monthly stakeholders meetings for port users at Mombasa and Nairobi.

The staff utilized by Kenya Ports Authority, Kenya Revenue Authority and Rift Valley Railways (K), are professionally trained in their respective areas. This guarantees the accordance of a quality service. The tricky part is where only one of the above three is a private institution, thus the variation in attitude.

Cottrill (1997) and Wong (1994) concluded that like trucking firms, railroads currently face severe capacity issues for example shortages in equipment and personnel compounded by heavy network congestion. They recommend terminal transfer efficiency e.g. train and railcar routing and scheduling effectiveness. Rift Valley Railways (K) faces a capacity problem as the fiat wagon fleet has continued to decline and is currently at 405 wagons (RVR (K), Rail tracker RT 15 Report dated September 15th, 2008). Table one on page nineteen shows the wagoh requirement projection that was done by Kenya railways in 2006. It shows 548 flat wagons as the number of flat wagons required to handle rail bound containers factoring in the growth in container imports. This projection increases the number of flat wagons from 456 wagons in year 2005/06 to 602 wagons in year 2007/08. This is an increase in the fleet by 32%: the figure is greater than the 12% growth in container imports (Kenya

Railways Strategic Plan, 2006). The Kenya Ports Authority board attempted to increase the railtainer capacity by approving the acquisition of 200 container carrier wagons. These were to offer railtainer services between the port and the inland container depots (ICDs) at Nairobi and Kisumu. The Kenya Ports Authority was to lobby the Kenya government for a go-ahead to acquire the 200 wagons. This was never realized as the government never gave an approval because of the then impending concession. (The East African Newspaper, Pg 18, dated April 26th, 2004)

Table 1: Wagon Requirements Projection

Wagon Type	Fit Wagons	2005/06	2006/07	2007/08
Flat	552	456	548	602
Covered	1107	1020	1224	1346
OFB's	144	156	187	206
LGB's	8	14	17	18
Low	182	103	124	136
CHB's	21	8	10	11
TTB's	30	97	116	128
Maintenance Cover	161	185	246	271
TOTAL	2205	2039	2471	2718

Source: Kenya Railways Strategic Plan 2006.

2.6 Shipping Containers

2.6.1 History of Shipping Containers

A container is a standardized packing box for cargo in which goods can be safely stowed away, stored and transported. It is designed for the most efficient use of space and for any type of transportation i.e. road, rail or sea. Standard ocean shipping containers are weatherproof, made of steel or similar material, constructed to withstand the high forces to which they may be subjected in high seas, and usually designed and sized to permit their efficient interchange for connecting with intermodal systems for inland rail or highway movement. Shipping containers are available in a variety of configurations that include end opening, side opening, half heights, open top. fiat rack, reefers and liquid bulk (tank). (Retrieved on August 27th. 2008 from wikipedia website <http://www.wikipedia/militarylogistic.com>)

By the 1920s, railroads in several continents were carrying containers that could be transferred to trucks or ships, but these containers were invariably smaller by today's standards. From 1926 to 1947, the Chicago North Shore and Milwaukee Railway carried motor carrier vehicles and shippers' vehicles loaded on flatcars between Milwaukee, Wisconsin and Chicago, Illinois. The first vessel purpose-built to carry containers began operation in Denmark in 1951. Nowadays the containers are either owned by the shipping lines or are leased from other companies for use by the shipping lines.

Chinitz (1950) a Harvard University economist predicted that containerization would benefit New York by allowing it to ship industrial goods produced there more cheaply to the Southern United States than other areas, but did not anticipate effect of containerization on world trade. Mclean (1956) pioneered the first domestic marine container shipments. This was based on his observations of the inefficiencies of break-bulk marine shipping at the time. Mclean later forged the first international container shipments in 1966. During

the first twenty years of growth, containerization meant using completely different and incompatible container sizes and corner fittings (twist locks) from one country to another. The difference in size and corner fittings affected the handling of containers. There were dozens of incompatible container systems in the U.S. alone e.g. twenty four and thirty five foot containers. The standard sizes, fitting and reinforcement norms that exist now evolved out of a series of compromises between international shipping companies. European railroads. U.S. railroads, and U.S. trucking companies. A lot of discussions on standardization took place among the stakeholders in the late 1960s. These discussions eventually resulted in the preparation for publication of the first draft of the resulting ISO container standards in 1970. (Retrieved on August 29th. 2008 from wikipedia website <http://www.wikipedia.org>)

Cargo containers generally conform to US and international standards that have been developed by the American National Standards Institute and the International Organization for Standardization (ISO) respectively. The size standards for outer dimensions of shipping containers are twenty or forty foot length, eight feet width, and 8 or 8'6 feet in height. To increase revenues, "high cube" containers with heights of 9'6 feet high have come into use. Depending on cargo density, a standard twenty foot container can carry up to thirty five tonnes while the forty-foot container can be loaded with up to thirty tonnes of cargo.

According to Marc Levinson (2006) the use of containers started during the Second World War while the history of container ships began in 1956, when the first container service was opened between the USA and Puerto Rico. Containerized shipping is a rational way of transporting most manufactured and semi-manufactured goods. This rational way of handling the goods is one of the fundamental reasons for the globalization of production. Containerization has therefore led to an increased demand for transportation. A conventional vessel required between eight to ten days to load or unload 10,000 tonnes of general cargo. A containership can handle the same volume in two days within

Europe and in three or four days on other continents. By 2005, containerization had revolutionized cargo shipping as approximately 90% of non-bulk cargo worldwide moved by containers.

2.6.2 Numbering of Containers

Each container is allocated a reporting mark which has four alphabetic characters ending with the letter IJ e.g. MAFIJ. The four alphabetic characters are also known as ownership code and are used for indicating the ownership e.g. MAEU is a container belonging to Maersk Shipping line. This is followed by a number comprising of 9 digits e.g. 12345678/9. The 9th digit is the last number and is separated from the other numbers by a slash. The alphabets and the numbers are for identification and tracking of the containers by the shipping line (principals or agents), consignor, and consignee. The same alphabets and digits are used for container tracking when loaded on a wagon using the rail tracker system. (Retrieved on August 29th, 2008 from wikipedia website <http://www.wikipedia.org>)

2.6.3 ISO Container Types

There are different types of containers available for different uses e.g. general purpose container, high cube pallet wide containers, reefers, open top bulkainers, open side, flush-folding flat-rack containers, platform or bolster, ventilated containers, tank containers/tanktainers and generator.

2.6.4 History of Containers in Kenya

The year 1975 marked the beginning of the container age in Kenya as two deepwater berths were brought to service specifically for serving container carriers (i.e. ships). The two berths were converted from conventional berths to container handling berths. This year marked the beginning of the container trade in Kenya as a total of 1.385teus were handled by the Port of Mombasa. The rapid increase in container traffic through Mombasa prompted the Kenya Ports Authority to extend the container handling operation upcountry. The

years that followed saw the setting up of two inland container depots at Embakasi in Nairobi and at Kibos in Kisumu. (Retrieved on August 29 , 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

In 1979, Mombasa Container Terminal which is a purpose-built facility with three berths and four forty tonne ship-to-shore gantry cranes commenced operation. Appendix III on page sixty one has a picture of the Container Terminal. The continued growth of import containers prompted KPA to convert berths Nos. 16 and 17 to container handling berths. In 1980 a purposely designed berth for container handling was brought into operation. This increased the number of container berths to three. The container business is the fastest growing sector in the Port of Mombasa. About 70 % of the port's total cargo is transported in containers. The container traffic is growing at a rate of 12 % per year. Shipping lines in Kenya deal with mostly twenty and forty foot containers. The abbreviation TEU is used when referring to a container and means twenty equivalent units. (Standard Newspaper, Transport Magazine Page 3, July 19th, 2007)

The establishment of the One Stop Centre within the terminal to accommodate all parties involved in container operations (i.e. Customs Department, the Port Police, Railways and Kenya Ports Authority) commenced in 2003 and was completed in 2004. In 2005. the new facility commenced operation and provided customers with a One-Stop Centre for document processing. The opening of the one stop centre has drastically reduced the time used in processing of documents as most of the players are located in the same building.

Lam, Sau-fung and Duncan (1994) assert that containerization has been regarded as the most influential development in shipping field since the seventies. The introduction of newly designed container ships and the sophisticated cargo handling systems in ports have largely improved the terminal productivity of container system when compared to the traditional

cargo handling method as illustrated in the study by McKinsey & Company (1967) that a container berth could handle over 2,000,000 tonnes of transit cargo when compared to a potential throughput of 100,000 tonnes across a conventional break - bulk (Retrieved on July 23rd, 2008 from HKU Scholars Hub website <http://www.hku.hk/handle>). The years from 2003 to 2005 marked KPA's equipment renewal and investment in several new container handling equipment, these included, panamax ship-to-shore gantry cranes, rubber tyred gantry cranes capable of stacking four high, new rail mounted gantry cranes, sisu reach stackers capable of stacking three high and terminal tractors. The Port of Mombasa handled 438,000teus in 2004 and 436,000teus in 2005 due to the equipment renewal and modernization project. KPA's aim is to reduce the average container dwell time to live days: this will have an overall effect of increasing the capacity of the terminal. (Retrieved on August 29th, 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

There are plans to establish a second container terminal south of the existing facility. This will give a combined throughput capacity of 700,000teus. It will entail the conversion of berths Nos. 11 to 14 in to fully fledged container berths. The second facility will be referred to as the East Container Terminal. This when operational will put further strain on clearance of containers from the port by rail, thus further compounding the problem of backlog unless measures are put in place by Rift Valley Railways (K) to take care of the increased capacity.

2.6.5 Issues Raised on Probable Causes of Container Backlog

Mongelluzo (2004) asserts that North American marine container volumes exceed forecast every year. Even if the ports can keep pace, railroad and truck capacities are tight, and inadequate road infrastructure has created further congestion issues. Another capacity shortfall is caused by the lack of collaboration among the numerous stakeholders affecting port capacity, including port authorities, longshore labor, terminal operators, railroads.

drayage carriers, and governments. Another driver of port capacity shortages is the unevenness of container flow caused by seasonal volume peaks, increasing vessels sizes, and unbalanced import versus export flow. Port congestion is detrimental to global supply chains.

Hon. Chirau the Kenyan Minister for Transport alleges that the cargo pile up at Mombasa port is caused by the failure of cargo owners to file documents in time. He proposed the embracement of professionalism through education as the solution to the congestion. (The Standard Newspaper. "Transport Magazine¹", February 1st, 2007. Page 3)

According to Abdalla former Kenya Ports Authority's Managing Director the backlog is as a result of "a number of importers using the port facility to store their cargo(for speculative purposes) while looking for buyers". Such cargo owners greatly contributed to continued backlog of containers at the port. Gardner the National Chairman of the Kenya International Freight & Warehousing Association (KIFWA), attributed the backlog to slow delivery of rail-bound containers and delay to transmit cargo manifest to Kenya Ports Authority and Kenya Revenue Authority by the port of origin. The manifest is first relayed to local shipping agents who change it to a version which can be transmitted electronically to Kenya Ports Authority and Kenya Revenue Authority. (The Standard Newspaper. "Transport Magazine", February 15th. 2007. Page 1-2)

Ochieng in his article in the Transport Magazine reported the container population at the container terminal to have reached a record 12,000 containers against the terminal's design capacity of 7000 containers. He attributed the backlog to the change of rail operator i.e. from Kenya Railways Corporation to Rift Valley Railways, which resulted in the capacity to move containers declining below the original 10%. During April, 2007 KPA also grappled with frequent power blackouts, low or high power voltages. This affected the

operations at the busy container terminal because most of the equipments are electrically powered. This resulted in slow loading and off-take logistics. (The Standard Newspaper, "Transport Magazine' May 24^h. 2007, Page 3)

According to Beja, KPA faced a major cargo clearance crisis after goods at the port increased by about 30%. The genesis of the congestion at the port was a backlog from December 2006 festive season, which saw a boom in imports attributed to improved economies in the region, rain, power outages hence grounded cargo handling cranes and heavy importation of COMESA market sugar which diverted trucks that transported containers. (The Standard Newspaper, "Transport Magazine", July 19^h. 2007. Page 3)

KPA's Public Relations Officer. Mr. Abok reported that KPA had embarked on plans to construct a second multi million dollar container terminal in Mombasa to cater for increased traffic and a widening hinterland market; it is expected to be ready for commissioning by 2013. Since December 2006, the port has experienced massive inflow of import containerized cargo. The influx has increased by over 40% compared to the same period the previous year. KPA attributed the increase in traffic to increased backlog in the neighboring ports leading to diversion of ships to Mombasa port because of its bigger container terminal and more modern handling equipment. The increase in cargo inflow was not matched with the off-take; the off-take was seriously affected by the repair on main trunk roads. (Our Ports Magazine. Issue No. 3. September. 2007. Page 20)

On October 9^h, 2007 Roy the former MD for Rift Valley Railways denied claims that RVR was responsible for container pile-up at the port of Mombasa. He said that Rift Valley Railways had instead grown its cargo transport capacity by 18 per cent between June and September 2007 and is further investing to enhance capacity. (Retrieved on September 23, 2008 from Business Daily newspaper website <http://www.bdafrica.com/index>)

According to Abdalla former KPA's MD. the port posted a growth rate of 10.5% against projected rate of 6.7% in the year 2007. The authority achieved a growth rate in the container units handled by 22.1 % (i.e. 585,367teus against the expected 532,168teus). This was attributed to major increase in import of full containers, increased marketing effort, modernization of the equipments and increase in the number of shipping lines using the port from 17 to 20 shipping lines (these connect the port with over 80 destinations). (African Shipping Review Magazine. Issue No. 21. Jan/March 2008. Pg. 14 15)

Inland Container Depots (ICDs)

Inland Container Depots are an extension of the port to the hinterland and are also referred to as "dry ports". There are three Inland Container Depots in the country and are located in Nairobi, Eldoret and Kisumu. They are all connected to the port by rail. According to Bernstein (2004) railroads are generally more cost effective than truck for handling inland container moves of significant distance. The containers are loaded on to wagons by Kenya Ports Authority and railed to Embakasi terminal by Rift Valley Railways (K) after discharge from the ship and documentation. The Eldoret ICD which was established in 1998 is dormant while the other two are active.

Both un-nominated and nominated loose Container Loads (LCL) and Full Container Loads (FCL) export traffic are accepted at the Depots. The Inland Container Depots therefore facilitate trade by acting as consolidation centers before cargo is finally documented and railed to Mombasa for shipment. The Inland Container Depots were established in order to speed up the flow of containers to and from* the hinterland. All cargo clearing, forwarding, documentation processes and payments are finalized at the Depots thus saving customers time that would have otherwise been used for traveling to Mombasa. The facilities are linked to the port via VSAT technology to ensure faster transfer of data to facilitate documentation.

Kenya Ports Authority owns and operates the two Inland Container Depots located at Embakasi in Nairobi and at Kibos in Kisumu near Lake Victoria. The two facilities were established in 1984 and 1994 respectively with the following objectives:-

- i. Extension of port services to the hinterland.
- ii. Reduce inland transport costs for importers and exporters.
- iii. De-congest the port by reducing container dwell time and congestion at the port by enhancing dispatch of import and off-take of export containers.
- iv. Minimize road damage and carnage by diverting container traffic from road to rail.

The Inland Container Depots have experienced tremendous growth over the past five years e.g. in 2005 ICD Embakasi handled 33,270teus when compared to 26,391teus in 2004 and 19,555teus in 2003. The Kibos ICD on the other hand handled a total of 4,366teus in 2005 in to comparison 4,218teus handled in 2004 and 3.671teuss in 2003. (Retrieved on August 29th, 2008 from Kenya Ports Authority website <http://www.kpa.co.ke>)

Why Customers and RVR Prefer Containerization

Containerization has a high security and safety factor as the contents are not exposed to the public thus eliminating temptation to pilfer. This results in reduced claims from customers because of the improved security of cargo as the customer receives the goods the same way they were loaded at the port of origin and this is further intensified by the door to door loading on wagons. The Railtainer trains are escorted by Railway Police, thus enhancing security of cargo.

Containerization enables customers to undertake bulk handling of grains and liquids. This minimizes product losses due to spillage or pilferage during transportation. Containerization has a high speed of handling when compared

to conventional products as bigger volumes are loaded on to wagons within a short time. It is faster to load and offload containers. This reduces the dwell time of wagons at the Port and thus improves the return on asset. Both loading and offloading is fast and is also done on a twenty four hours basis resulting in a faster turn around of wagons. The containers are handled as a unit (i.e. inclusive of the contents) thus reducing the costs of handling when compared to handling of loose items e.g. bagged products. Flexibility in the use of the same wagon as it can be used for conveyance of general containers, bulk grains containers, liquidators, and general cargo container.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

This is a case study and a descriptive design was used in assessing the probable causes of the railtainer backlog. This is because descriptive research portrays an accurate profile of persons, events, or situation (Robson, 2002). The approach is appropriate as the study involved fact-finding/enquiries that described the railtainer backlog and allowed for the collection of large amounts of data from the target population. The study used both quantitative and qualitative approaches so as to effectively achieve the objective.

3.2 Population

The population of study comprised of seventy five staff (i.e. forty five from Rift Valley Railways and thirty staff from Kenya Ports Authority) currently working at the New Container Terminal and RORO. These are managers, supervisors and other staff working for Rift Valley Railways (K) and Kenya Ports Authority. They are the ones who deal directly with rail bound containers, are conversant with the problems facing it and also add value to the service. They are involved in management, loading, offloading and documentation of containers at the Port of Mombasa and inland container depot Embakasi.

3.3 Sampling

Stratified random sampling was used to estimate the proportion of the respondents. This design was useful in describing the characteristics of components and determining the frequency of key attributes studied. It was also suitable because we were dealing with a heterogeneous population. A sample of forty percent of the population of seventy five was selected from the employees working at the port (i.e. New Container Terminal and RORO). They were categorized as A for managers, B for supervisors and C other staff. The sample was adequate and representative of the population under study. Table 2 on page thirty one shows the target population and the sample.

Table 2: Population and Stratified Sample Proportion

Category	Firm	Population	Sample
A	RVR	5	2
	KPA	4	2
B	RVR	9	4
	KPA	8	3
C	RVR	31	12
	KPA	18	7
Total		75	30

Source: KPA and RVR RMG/RORO Staff List

3.4 Data Collection

The study used a semi structured and undisguised questionnaire to gather primary data. The questionnaire comprised of both open and closed ended questions. The open ended questions were used to enable the respondent give detailed information. Ordinal and nominal scales were used to rate the different variables that measured the existence and causes of railtainer backlog. A copy of the questionnaire is in appendix II on page fifty seven. The questionnaire was divided into three sections i.e. section I, II and III. Section 1 was used to collect general information on the respondents while section II was used to collect specific information from both Kenya Ports Authority and Rift Valley Railways (K) employees. Section III was used to collect information from Rift Valley Railways (K) employees only as the questions involved could only be well answered by someone with rail operation exposure. The questionnaire assisted in getting the information on and rating of the probable causes to the backlog of rail bound containers. The respondents of the study were managers, supervisors and other staff working for both Kenya Ports Authority and Rift Valley Railways (K). The questionnaire was administered on a "drop and pick later" basis and a follow-up was made to ensure a high rate of response.

3.5 Data Analysis and Presentation of Results

The completed questionnaires were edited for completeness and consistency. The data was then coded to enable grouping of the responses into categories. Frequency tables, tabulation, percentage, proportion, means, graphs and pie charts were used to present the relationship between specified characteristics exhibited. SPSS package was also used to assist in data coding and analysis. The qualitative data was presented in form of narration that described the sample. (Mugenda and Mugenda, 2003)

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.0 Introduction

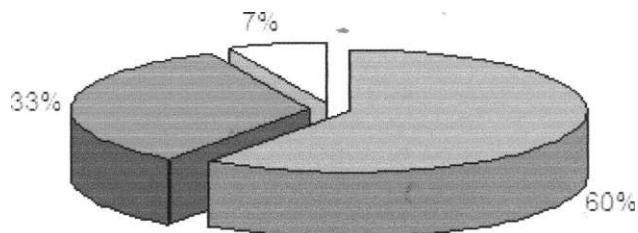
This chapter presents the findings of the study on railtainer backlog. A total of thirty questionnaires were administered but only twenty eight questionnaires were filled and returned, this translates to ninety three percent response. There was a non-response rate of two translating to seven percent.

4.1 Data Presentation And Analysis

Table 3: Distribution Of Respondents By Company

	Frequency	Percentage
RVR	18	60%
KPA	10	33%
Non- Response	2	7%
Total	30	100%

Resume To On>trton< By RVR flQ ind KP



• RVR a KPA • Non- Response

A response of ninety three percent was achieved from both Rift Valley Railways (K) and Kenya Ports Authority employees during the research. The response from Rift Valley Railways (K) was sixty percent while Kenya Ports Authority thirty three percent and non-response of seven percent all being from Kenya Ports Authority. The research is considered a success because of the response achieved.

Table 4: Designation of Respondents

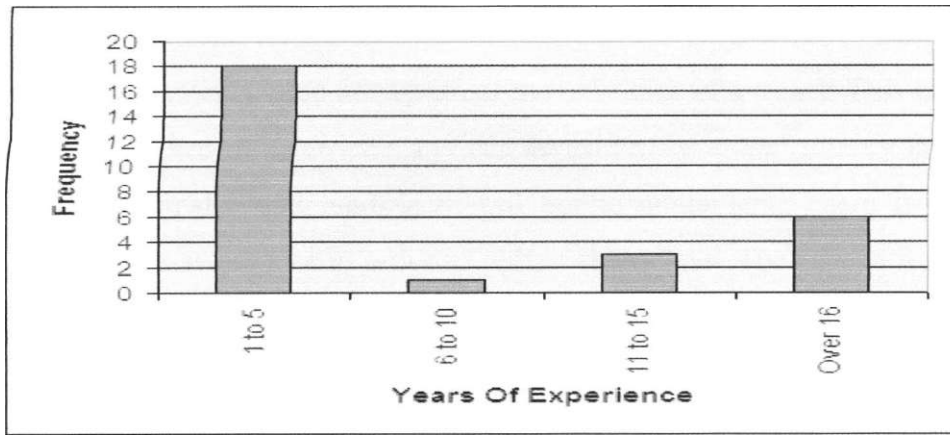
Category	Firm	Response	Non -Response
Managers (A)	RVR	2	0
	KPA	2	0
Supervisors (B)	RVR	4	0
	KPA	3	0
Others (C)	RVR	12	0
	KPA	5	2
Total		28	2

A total of four managers from both Rift Valley Railways (K) and Kenya Ports Authority responded (i.e. two from each organization), while four supervisors from Rift Valley Railways (K) and three from Kenya Ports Authority responded. This translates to one hundred percent response from both managers and supervisors. While in the others category a total of twelve responded from Rift Valley Railways (K) and five from Kenya Ports Authority. There was a non-response of two from Kenya Ports Authority. The response from the others category translates to 89.5% response and a 10.5% non-response.

Table 5: Experience of Respondents in Handling Containers

Range (Years)	Frequency
1 to 5	18
6 to 10	1
11 to 15	3
Over 16	6
Total	28

Respondents Experience In Handling Containers

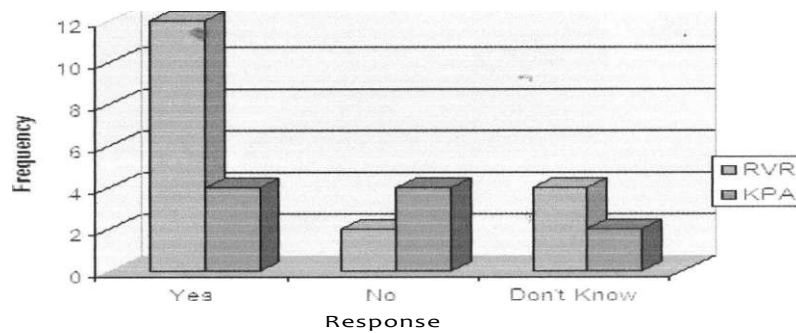


In terms of experience of those interviewed in dealing with railtainer service, the highest response was from category 1 - 5 years which had a frequency of eighteen, followed by over sixteen years experience with a frequency of six, then category 11 - 15 years with a frequency of three and lastly a response of one from category 6 - 10 years. The implication being majority of the respondents have experiences ranging between one to five years in dealing with railtainer.

Table 6: Awareness Of The Existence Of A Target Dwell Time

	Frequency			Percentage
	RVR	KPA	Total	
Yes	12	4	16	58%
No	2	4	6	21%
Don't Know	4	2	6	21%
Total	18	10	28	100

Awareness Of The Existence Of A Target Dwell Time

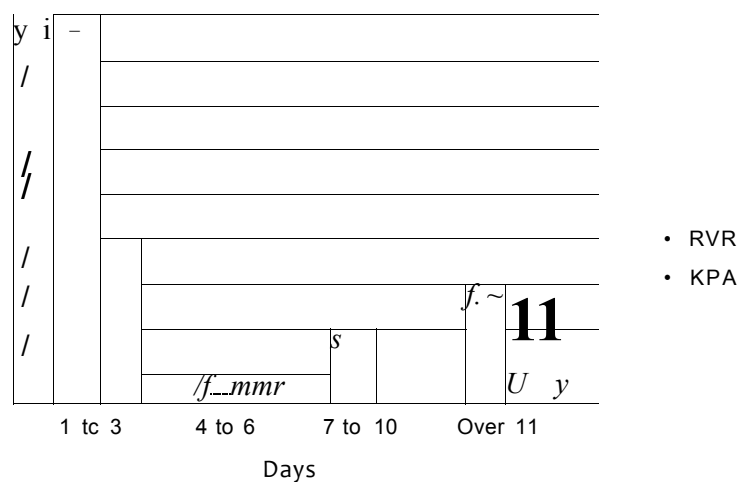


A total of sixteen out of the thirty respondents were aware that there was a target dwell time for rail bound containers at the port, while twelve out of the thirty respondents were not aware of the existence of a target. This translates to fifty eight percent awareness and can be said to be a contributory factor to the delay in transfer and loading of rail bound containers. There is a need to increase the awareness in order to reduce the delays. The rate of unawareness stood at forty two percent which is high by any standards. In terms of company Rift Valley Railways (K) had the highest rate of awareness at sixty seven percent while Kenya Ports Authority had thirty three percent. There is a need to increase the level of awareness among Kenya Ports Authority staff handling rail bound containers in order to minimize/eliminate the backlog.

Table 7: Target Dwell Time

Target Days	Frequency			Percentage
	RVR	KPA	Total	
1 to 3	8	3	11	69%
4 to 6	0	0	0	0%
7 to 10	1	0	1	6%
Over 11	2	2	4	25%

Target Dwell Time Of containers At The Port

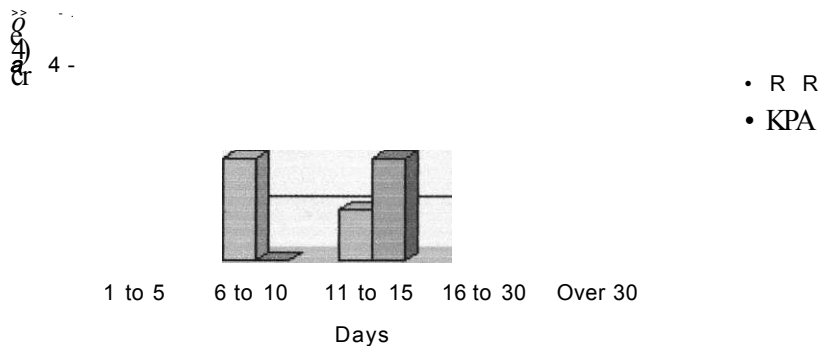


A total of eleven respondents translating to sixty nine percent of the respondents were of the view that the targeted dwell time falls between one to three days, while four of the respondents translating to twenty five percent were of the view that it is over eleven days. Only six percent of the respondents were of the view that it is between seven to ten days.

Table 8: Actual Dwell Time

Target Days	Frequency			Percentage
	RVR	KPA	Total	
1 to 5	4	3	7	25%
6 to 10	2	0	2	7%
11 to 15	1	2	3	11%
16 to 30	8	3	11	39%
Over 30	1	0	1	4%
Non- Response	2	2	4	14%
Total	18	10	28	100%

Actual Dwell Time



The category of sixteen to thirty days achieved the highest response with a frequency of eleven which translates to thirty nine percent of the response. It was followed by one to five days that received a response frequency of seven which translates to twenty five percent.

Table 9: Rating of the Causes of the Railtainer Backlog

Causes Of The Railtainer Backlog	Ratings			
	A	B	C	D
Insufficient wagons (IW)	24	1	3	0
Few heavy container carriers (FHWC)	14	9	3	2
Poor stacking logistics by KPA (PSTL)	6	16	3	3
RVR's lack of control on what is offered (RFC)	3	14	9	2
Unreliable locomotives (UL)	11	10	5	2
Long transit times (L I T)	17	8	1	2
Poor turn around of wagons (PTA)	18	7	1	2
Documentation (DOC)	6	12	8	2
Verification (VER)	4	8	14	2
Increase in imports (IIVO)	7	11	8	2

**Note: - D - is used for situations where there was no response.*

Insufficient wagon was rated the leading cause amongst the major contributors, it had a frequency of twenty four. The major contributors were rated as follows in a descending order:-

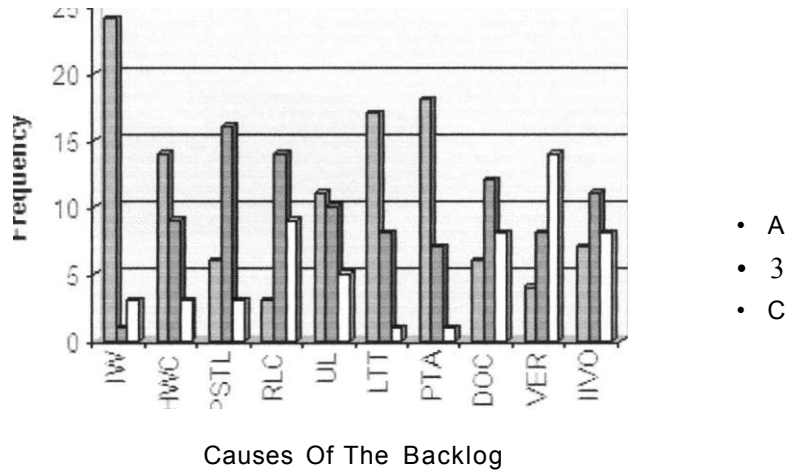
- Insufficient wagons
- Poor turn around of wagons
- Long transit times
- Few heavy container carriers
- Unreliable locos
- Increase in imports
- Poor stacking logistic by KPA
- Documentation
- RVR's lack of control on what is loaded

The minor contributors were rated as follows in a descending order:-

- Poor stacking logistics by KPA
- RVR's lack of control on what is loaded
- Documentation
- Increase in imports

- Unreliable locos
- Few heavy container carriers
- Long transit times/Verification
- Poor turn around of wagons
- Insufficient wagons

Rating Of The Causes Of The Raitainer Backlog



Other Causes Of Backlog

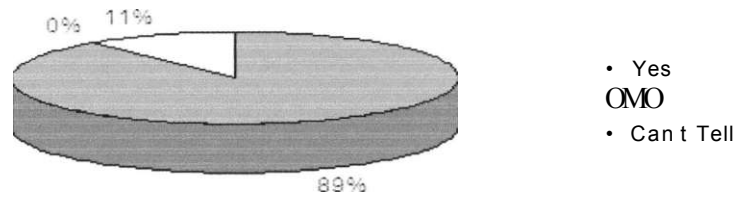
The respondents also came up with what they perceived to be the other causes of the backlog. They were identified as follows:-

- Line blockages due to accidents
- Insufficient handling equipments
- Failure of handling equipments
- Lengthy customs procedures
- Demotivated RVR (K)staff
- Laxity of KPA staff
- Corruption
- Failure to observe the FIFO system of loading

Table 10: Awareness Of Delay In Loading

	Frequency	Percentage
Yes	16	89%
No	0	0%
Can't Tell	2	11%
Total	18	100%

Awareness Of Delay In Loading



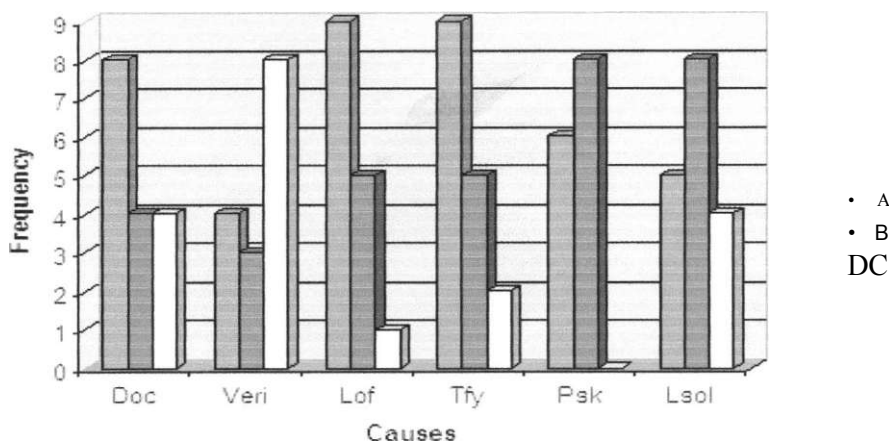
A total of eighty nine percent of the respondents admitted to there being delay in loading while eleven percent of the respondents were unable to say whether there was a delay in loading or not.

Table 11: Rating Of The Reasons For The Delay In Loading

Reasons For Delay In Loading	Ratings			
	A	B	C	D
Documentation (Doc)	8	4	4	2
Verification (Veri)	4	3	8	3
Lack of Wagons (Lof)	9	5	1	3
Transfer from yard to RMG (Tfy)	9	5	2	2
Poor stacking KPA logistics (Psk)	6	8	0	4
Low speed of loading (Lsol)	5	8	4	1

***Note:** - D is used for situations where there was no response.

Rating Of The Reasons For The Delay In Loading



The respondents rated the following reasons in a descending order as the major contributors to the delay in loading:-

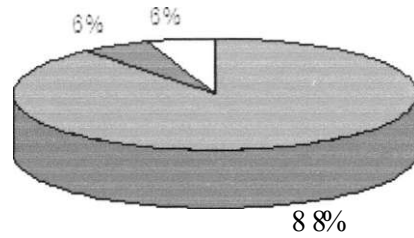
- i. Lack of wagons and transfer of containers from yard to RMG.
- ii. Documentation
- iii. Poor stacking by KPA
- iv. Low speed of loading
- v. Verification

The most critical areas to be addressed in order to minimize/eliminate the delay in loading are lack of wagons, transfer from yard to RMG and documentation as they are the ones that had frequencies that were above the mean of 6.8.

Table 12: Timeframe For Loading A Railtainer Rake

	Frequency	Percentage
Yes	16	88%
No	1	6%
Don't Know	1	6%
Total	18	100%

Timeframe For Loading A Railtainer Rake

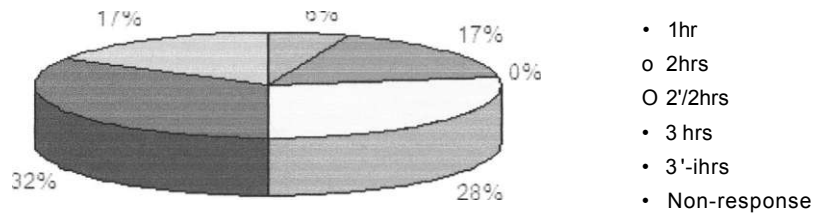


A total of eighty eight percent of the respondents (i.e. RVR employees) were aware that there was a targeted timeframe for loading of a railtainer rake, six percent were not aware of a loading target while the remaining six percent couldn't tell whether there was a target or not. There is need to reduce the rate of unawareness in order to minimize/eliminate the backlog as more effort will be geared towards improving the utilization of wagons by managing the loading time for a railtainer rake.

Table 13: Target Timeframe For Loading a Railtainer Rake

Hours	Frequency	Percentage
1hr	1	6%
2hrs	3	17%
2¹/₂hrs	0	0%
3hrs	5	28%
3³/₄hrs	6	32%
Non-response	3	17%
Total	18	100%

Target Timeframe For Loading a Railtainer Rake

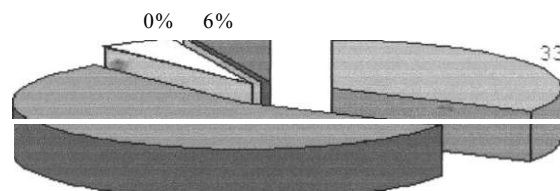


The highest response on target timeframe for loading a railtainer rake was thirty two percent for three and a half hours timeframe, followed by twenty eight percent for three hours. Only two hours, three hours and three and a half hours target timeframe had frequencies that were above the mean of three.

Table 14: Achievement Of Target For Loading a Railtainer Rake

Target Achievement	Frequency	Percent
25%	6	33%
50%	10	55%
75%	1	6%
100%	0	0%
Non-response	1	6%
Total	18	100%

Achievement Of Target For Loading A Railtainer Rake



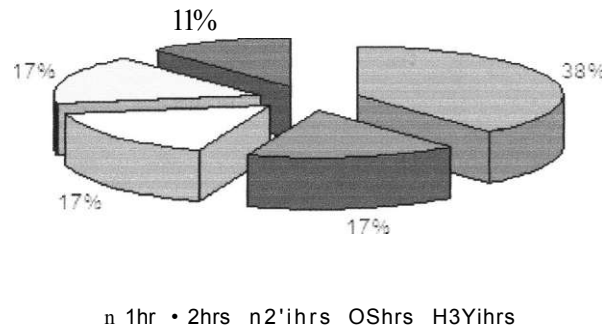
• 25% o 50% O 75% O 100% a Non-response

On the achievement of the loading target, fifty five percent of the respondents were of the view that there was a fifty percent achievement of the railtainer rake loading target while thirty three percent of respondents were of the view that there was a twenty five percent achievement. Only one out of the sample of eighteen didn't respond. Only twenty five and fifty percent achieved ratings that were above the 4.3 mean.

Table 15: Time It Takes To Place A Railtainer Rake

Time	Frequency	Percent
1hr	7	38%
2hrs	3	17%
2½hrs	3	17%
3hrs	3	17%
3½hrs	2	11%
Total	18	100%

Time It Takes To Place A Railtainer Rake



A total of thirty eight percent of the respondents say that placing is done within one hour from arrival of a train; fifty one percent of the respondents believe it is done between two to three hours after arrival of a train while eleven percent of the respondents believe it is done within three and a half hours after arrival of a train. It is only one hour placing time that received a rating that was above the mean of 3.6. It can thus comfortably be concluded that placing is done one hour after the arrival of a train.

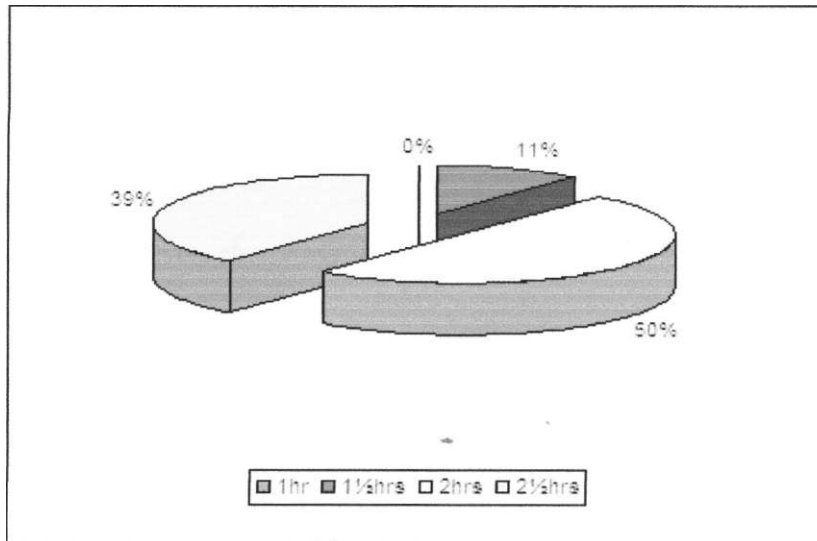
Reasons For Delay In Placing A Raitainer Rake

Shortage of a shunting locomotive, Carriage & wagon examiners checking and repairing the rake were the other reasons identified that affected timely placing of a raitainer rake for loading. Laxity of staff was also identified but to a lesser extent.

Table 16: Time It Takes To Marshall A Raitainer Rake

Time	Frequency	Percentage
1hr	0	0%
1 Vzhrs	2	11%
2hrs	9	50%
2/4hrs	7	39%
Total	18	100%

Time It Takes To Marshall A Raitainer Rake



A total of fifty percent of the respondents say that it takes two hours to marshal a raitainer rake, thirty nine percent say that it takes two and a half hours while eleven percent say that it takes one and a half hours. Only two hours and two and a half hours marshalling time received ratings that were above the mean of 4.5. This implies that most of the marshalling takes between 2 - 2½ hours. There is a need to move toward marshalling within one hour in order to reduce dwell time and eliminate the backlog.

Table 17: Rating of Reasons for Deviation From Target

Reasons for deviation	Rating			
	A	B	C	D
Shunting engine load capacity (Selc)	4	7	5	2
Unreliability of shunting loco Uosl)	4	9	1	4
Few lines at Kipevu marshalling yard (Flkmy)	9	6	0	3
Haphazard loading by KPA (Hlbk)	6	4	4	4
Variation in wagon gross load capacity (Vwlc)	12	2	1	3
Number of wagons involved (Nwi)	8	6	1	3

*Note: - D - is used for situations where there was no response.

The variation in wagon gross load capacity, few line and number of wagons were rated highly as the major contributors to deviation from marshalling target. They are also critical for success as they are the ones with frequencies above the mean of 7.2 and as such needs to be addressed in order to minimize the backlog and improve on wagon turn around. The unreliability of shunting engine, shunting load capacity, number of wagons involved and few lines at Kipevu yard were rated highly among the minor contributors as they had frequencies above the mean of 5.5 among the minor contributors.

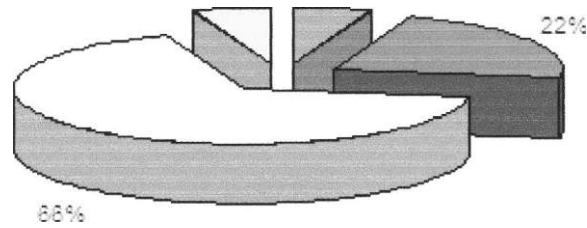
4:4 Other Reasons for Deviation from Target

Other reasons were given for the deviation from marshalling target and they were as follows wrong labels, lack of wagon covers and manifest, demotivated staff, low manning levels per shunting locomotive and marshalling a railtainer rake while receiving/dispatching a train.

Table 18: Average Dwell Time of A Rake From Arrival To Departure

Time	Frequency	Percentage
5hrs	1	6%
7 hrs	4	22%
10hrs	12	66%
Over 10hrs	1	6%
Total	18	100

Average Dwell Time of A Rake From Arrival To Departure



• :hr • Ins motifs DOver 10hrs

The average dwell time of a rake at Kipevu was ten hours; it received the highest rating and had a sixty six percent response. It's clear that rakes have a long dwell time and there is need to reduce this in order to minimize the backlog and improve on the wagon utilization. The mean for average dwell time of a rake is 4.5 and only ten hours timeframe received a rating that was above the mean.

CHAPTER FIVE: SUMMARY AND CONCLUSIONS

5.0 Introduction

The study intended to find out the railtainer backlog at the port of Mombasa. Its objective was to find out the causes of the backlog with specific reference to certain variables. An analysis was made from the data collected.

5.1 Summary of Findings

The following were the findings from the data collected and analyzed. A response of twenty eight was achieved from the sample of thirty. This is a ninety three percent response on the railtainer backlog research study. There was a fifty eight percent response on the awareness of the existence of a target container dwell time at the port after offloading. Rift Valley Railways had the highest rating on target container dwell time i.e. sixty seven percent when compared to Kenya Ports Authority's thirty three percent. The container target dwell time of one to three days had the highest rating of sixty nine percent. On the actual container dwell time at the port sixteen to thirty days received the highest rating at thirty nine percent. The implication being that most containers stay at the port for sixteen to thirty days before being loaded.

The railtainer backlog had a number of causes with following being rated highly among the major contributors" i.e. insufficient wagons, long transit times and unreliable locomotives. All these variables are within the control of Rift Valley Railways (K).

A total of eighty nine percent of the respondents admitted that there are delays in the loading of rail bound containers. A number of reasons were rated for the delays considering the magnitude of their contribution to the railtainer backlog problem. They were rated as follows in terms of. being major contributors starting with lack of wagons, transfer of containers from the yard to RMG. documentation and lastly poor stacking logistics by Kenya Ports Authority.

A total of eighty eight percent of the respondents admitted to being aware of a railtainer rake loading target timeframe. They only differed on the timeframe as there was no consensus on one timeframe and neither did one time receive an over fifty percent rating. The highest rating for a single timeframe was only thirty two percent. The achievement of the railtainer rake loading target timeframe by Kenya Ports Authority was rated at fifty percent by the respondents.

Thirty eight percent of the respondents rated one hour as the time it takes to place a railtainer rake for loading after arrival of a train. There are times when the placing is done after one hour resulting in a deviation from the target. The following reasons were given for the deviation i.e. shortage of a shunting locomotive, rolling stock staff examining, checking and repairing the rake on arrival of a train from upcountry. Laxity of staff was also identified but to a lesser extent

A total of fifty percent of the respondents rated two hours as the time it takes to marshal a railtainer rake. The other fifty percent distributed their rating between one and a half hours and two and a half hours. They advanced a number of reasons for the deviation from the target railtainer marshalling time. The reasons were rated as follows in descending order i.e. variation in wagon gross weight capacity, few lines at Kipevu marshalling yard, the number of wagons involved and finally haphazard loading by Kenya Ports Authority.

Finally the average dwell time for a railtainer rake from arrival at the port to departure was rated at ten hours on average; it received a rating of sixty six percent from the respondents.

Recommendation for Further Research

There is need to undertake the same study to cover Embakasi, Kibos, Kampala and all other variables that affect the raitainer service. A study should be done on the relation between growth in container import volumes and raitainer service off-take capacity. The study should also include studying the effect of the size of the ships on raitainer off-take capacity.

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Appendix I

Letter Of Introduction To Respondents

University Of Nairobi

School Of Business
P.O.Box 30197
Nairobi. Kenya

Telephone +254 - 20318262
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

.../.../2008

Dear Sir/Madam.

The bearer of this letter Mr
Registration No.....Telephone No.....is a Master of Business
Administration (MBA) student at the University of Nairobi.

The student is working on a research project entitled "Railtainer Service Backlog" as
part of his course work assessment.

We would therefore appreciate if you could assist the student collect data in your
organization. The results of the report will be used solely for the purpose of the
research.

Thank you.

The MBA Co-ordinator.

Appendix II: Questionnaire

Section I: General Questions (To Be Answered By both RVR and KPA Staff)

1. Which company do you work for?

RVR KPA

2. What is your designation?

Manager .. Supervisor Others

3. How long have you worked for your company?

1 - 5 years • 6 - 10 years • 11-15 years D Over 16 years •

Section II: To Be Answered By KPA/RVR Staff

4. Do rail-bound containers have a targeted dwell time at the port (i.e. after discharge from ships)?

Yes [] No • Don't know fI

5. If the answer to question four is "yes", then what is the targeted dwell time?

1-3 Days: 4 - 6 Days 7- 10 Days Over 11 Days •

6. How long does it take for a container to be loaded on to a wagon after discharge from a ship?

I to 5 days 0

6 to 10 days •

II to 15 days H

16 to 30 days •

Over 30 days

7. Using A to C (i.e. A - major contributor, B minor contributor, C not a contributor), rate the appended causes of the backlog of rail bound containers in terms of their contribution by ticking the appropriate column:-

	A	B	C
Insufficient wagons	()	()	()
Few heavy container carriers	()	()	()

Poor stacking logistics by KPA	()	()	()
RVR's lack of control on what is offered	()	()	()
Unreliable locomotives	()	()	()
Long transit times	())	()
Poor turn around of wagons	())	()
Documentation	())	()
Verification	())	()
Increase in imports	())	()

8. Are there other causes of the backlog apart from the ones in question seven, then specify

Section 111: To be Answered By RVR (K) Staff Only

9. Do you experience delays in loading of containers on to wagons?

Yes ! No • Can't tell C

10. If the answer to question nine is "yes", then using A to B (i.e. A- major contributor, B least contributor, C not a contributor), rate the reasons for the delay in loading of rail bound containers by ticking the appropriate column.

	A	B	C
Documentation	()	()	()
Verification	()	()	()
Lack of Wagons	()	()	()
Transfer from yard to RMG	()	()	()

Poor stacking KPA logistics () () ()

Low speed of loading () () ()

11. Is there a targeted time frame for loading a Railtainer rake?

Yes No Don't Know

12. If the answer to question eleven is "yes", then state the targeted time frame?

1 hour 2 hours 2½ hours 3 hours 3½ hours

13. How would you rate the achievement of the Railtainer loading target?

25% 50% 75% : 100% .

14. How long does it take on average to place a Railtainer rake for loading at RMG after termination of a train at Kipevu?

1 hour r 2 hour 2½ hours • 3 hours [(her 3½ hours

15. If it takes over 3½ hours, then specify the reasons for the delay in placing the rake?

16. How long does it take to marshal a-Railtainer train?

1 hour IV- hours; 2 hours • 2½ hours

17. If it takes more than the targeted time then using A to C (i.e. A major contributor, B minor contributor, C not a contributor), rate the reasons for the deviation by ticking the-appropriate column.

	A	B	C
Shunting engine load capacity	()	()	()
Unreliability of shunting loco	()	()	()
Few lines at Kipevu marshalling yard	()	()	()
Haphazard loading by KPA	()	()	()

Variation in wagon gross load capacity () () ()

Number of wagons involved () () ()

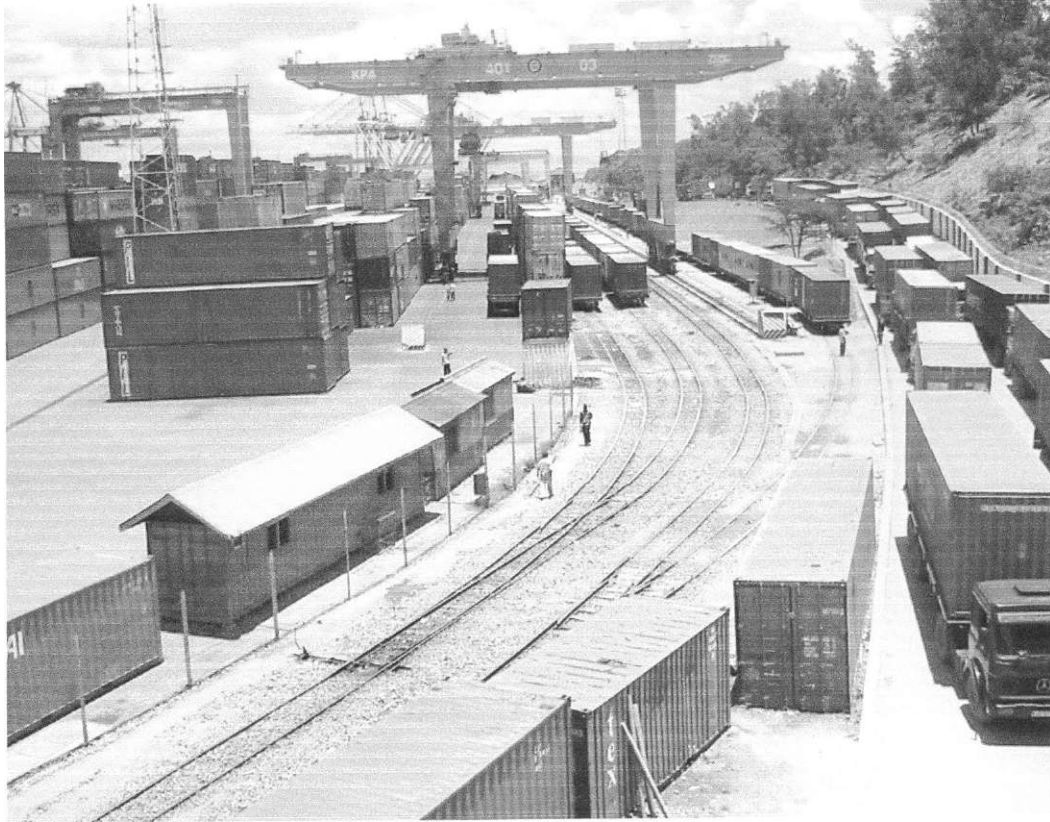
18. Are there other reasons for the deviation, then specify?

19. What is the average dwell time of a Railtainer train rake from arrival at Kipevu to departure for upcountry after loading?

5 hours • 7 hours • 10 hours Over 10 hours

Appendix III

Rail Mounted Gantry Yard



Source: RVR Safety File November 2007

Appendix IV

New Container Terminal Stacking Yard



Source: RVR Safety File November 2007

Appendix V
Kenya Ports Authority Railage Performance

RAILTAINER PERFORMANCE IN AUGUST 2008									
DESTINATION	BALANCE								FORECAST
	LOADED CONTAINERS								ETA BY
	MAY	JUN	JUL	AUG	20'	40'	HEAVIES		
EMBAKASI £.	35	0	0	81	316	308	89	20	80
KISUMU	0	25	37	0	0	54	8	14	12
KAMPALA	8	0	76	149	53	275	3	102	48
MALABA	0	0	8	14	0	22	0	4	7
ORDINARY	0	0	0	0	0	0	0	0	3
TOTAL	43	25	121	244	369	659	100	140	150

Source: Kenya Ports Authority Website <http://www.kpa.co.ke>, Retrieved on September 2nd, 2008.